

SMART INHALER

A Modern Medical Device

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Abstract

Asthma is the most common unpreventable chronic condition among children under the age of 18, affecting 6.3 million (CDC). The number of children with asthma in America increases exponentially every year, yet inhalers have not been designed or redesigned in decades to fulfill the physical, emotional, and mental needs of a child. Asthma is the leading cause for child hospitalization, emergency room visits, and missed school days among ages 5-17.

Asthmatic Children:

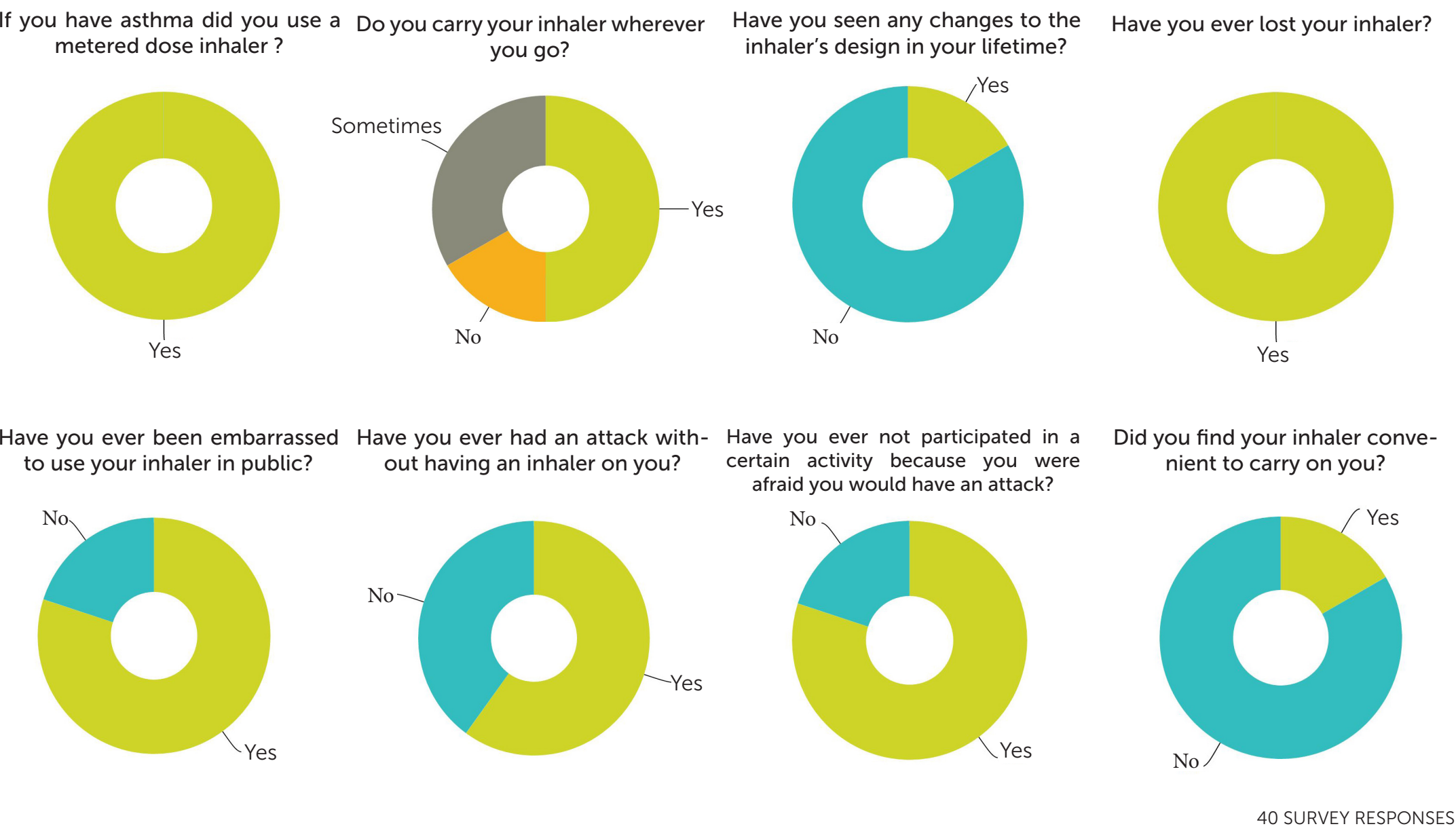
The most vulnerable to this chronic disease and are hospitalized the most out of all age groups (ALA). Children suffer from more attacks than adults and rely on their medication heavily to recover.

Metered Dose Inhalers (Emergency Inhaler):

The simplest and most accessible medical device used to treat asthma, but they have not been designed to fulfill the needs of a child. For decades, they have been the standard despite their inconvenient design, but **what if there was a better way to treat asthma?**

Design Opportunity

In experiencing the chronic disease of severe asthma since birth, I chose this subject for my thesis project. Research was done through literature review, Online surveys and in person interviews. The population included adults who experienced asthma as a child, parents of children with asthma and teens with asthma. The objective was to investigate the perception of other inhaler users to formulate a change in treating asthma. The goal was to develop an improved inhaler based on those perceptions, incorporating quality and simplicity in use for daily life.



Key Issues

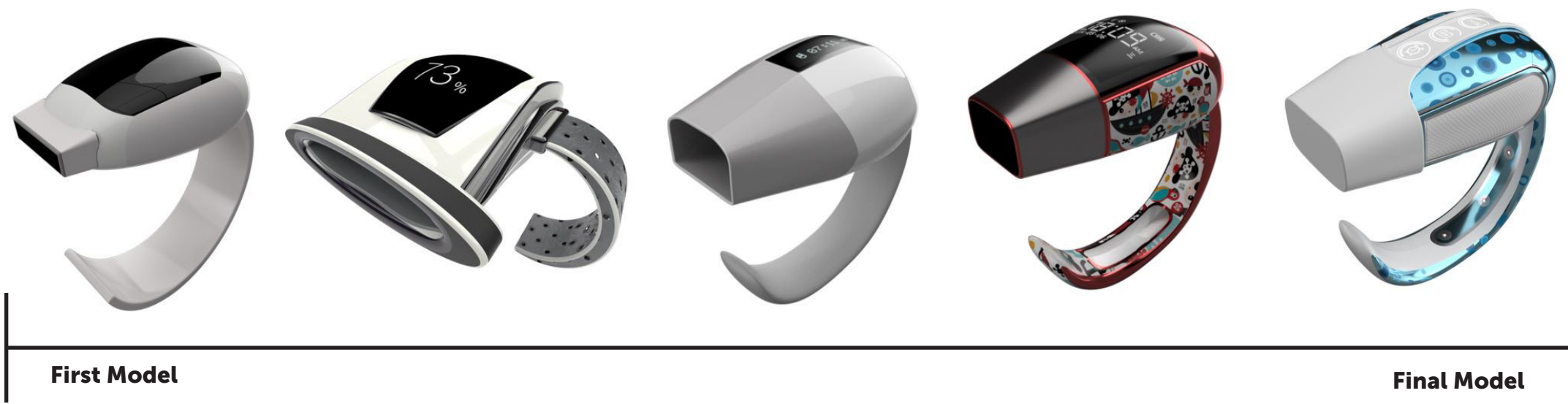
Results revealed several barriers to children using their inhalers. It is reported that current inhalers are ergonomically incorrect for a child, requiring children to stretch their hand uncomfortably to deliver the proper dosage. Parents reported the inhalers lacked a meter to keep track of the number of puffs remaining in the canister, therefore, not knowing how much medication was available in case of emergency. Others reported the inhaler design is bulky making it unmanageable to carry in their pocket, resulting in the patient leaving it at home. Interviews revealed the flaws of the inhaler and also the interaction and social issues that come along with using an inhaler. A mother of a 6 year old asthmatic revealed how her daughter is so embarrassed to use her inhaler in public that she refuses to tell anyone when she is having an attack. In class she would **“Cough her lungs out and struggle to breath before she took her inhaler because she felt it put an embarrassing spotlight on her whenever she used it and she didn’t want other kids to know about her asthma”**, My research uncovered a whole community of teens and kids who live with the stigma that having asthma is something to be embarrassed of, **what if their inhaler’s design gave them the confidence to use their inhaler no matter where they are?**

Solution

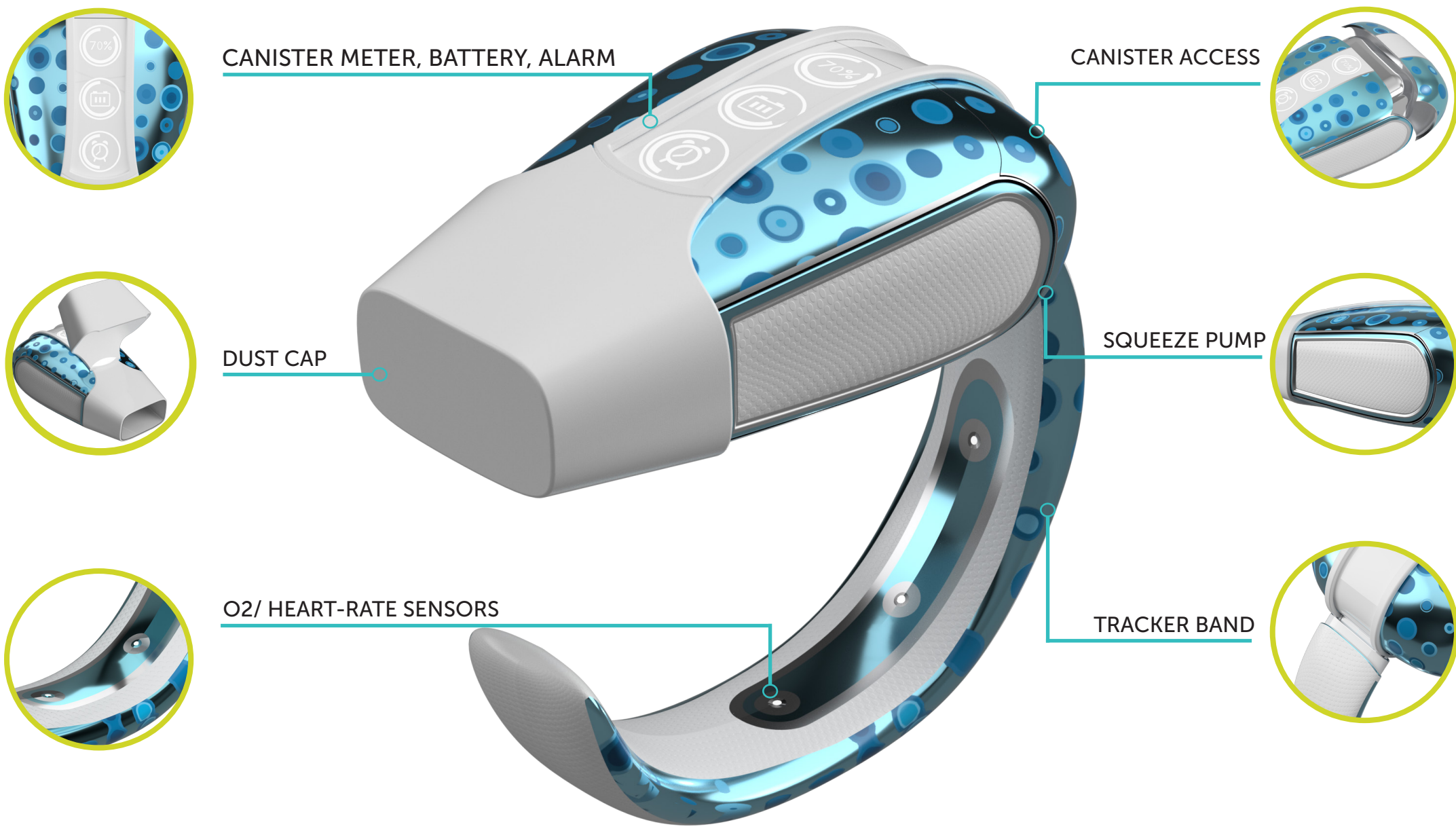
With modern day fitness tracking technology, I introduce to you a research-based, kid friendly metered dose inhaler featuring an informative interface that records the canister levels of medication and provides a “puff” reminder to the patient actively experiencing an asthma attack.

The Smart Inhaler guarantees the patient ease of use with a squeeze activated puff, ease of transportation, efficiency, comfort, and gives asthmatics the confidence and accessibility to use their inhaler in public. The device connects to a companion app through blue-tooth allowing parents and patients to review and monitor heart rate, O2 statistics, frequency of use, and records information for their physician so that they may accurately prescribe the patient according to their needs. It also educates the patient regarding boundaries and limitations in daily life activity to prevent future attacks from occurring. The flexible wristband that connects with the inhaler contains sensors to record data and can be worn separately while the inhaler is in the child’s pocket.

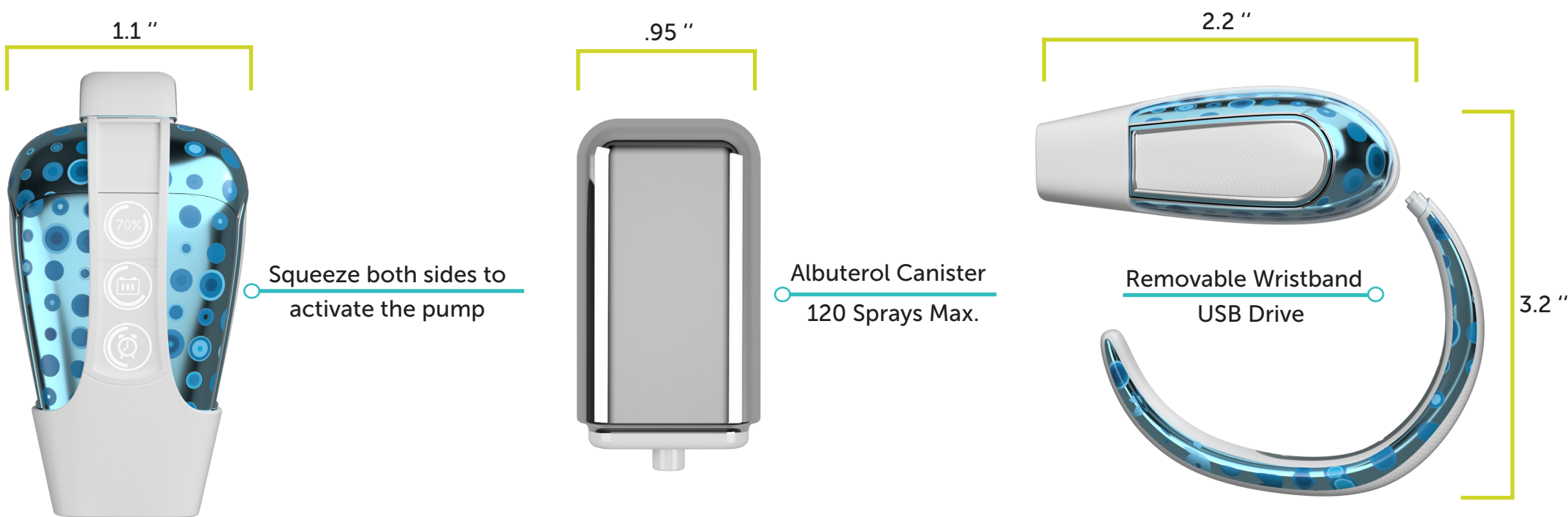
Refinement



Key Features



Dimensions



The Problem



The Solution

